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RESULTS OF THE SPACE SHUTTLE DISCOVERY MISSION

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

SECOND SESSION

ON

THE RESULTS OF THE SPACE SHUTTLE DISCOVERY MISSION

OCTOBER 13, 1988

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RESULTS OF THE SPACE SHUTTLE DISCOVERY MISSION

THURSDAY, OCTOBER 13, 1988

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION,
Washington, D.C.

The Committee met, pursuant to notice, at 4:00 p.m., in room SR-253 Russell Senate Office Building, Hon. Ernest F. Hollings, (Chairman of the Committee) presiding.

Staff members assigned to this hearing: Marty Kress and John Graykowski, professional staff members; and Sherman Joyce, minority staff counsel.

OPENING STATEMENT BY THE CHAIRMAN

The CHAIRMAN. Good afternoon. The Committee will please come to order. This is a joyous occasion for us on the Committee.

I can start, Captain Hauck with you and your colleagues by saying we couldn't be more proud. You have had 32 long months preparing for this mission and you have maintained the discipline, the training and all the sacrificing. I am also delighted to see your wives here too because it was their sacrifice and support that has put America back up in space.

Dick Truly, Admiral, particularly I congratulate you because you started with us and went through the torturous hearings on the Challenger disaster. Now to oversee this whole thing and bring us all back to where we belong, we just can't thank you enough.

We are here today to welcome the crew of the Discovery space shuttle mission, their wives and Admiral Truly to the Committee and to hear from the crew about their recent mission.

We are overjoyed by the mission's success. By all indications, the redesigned booster rockets performed as expected, the shuttle appears to be safe to fly and the launch of the NASA communications satellite proceeded without a hitch. The entire operation, from the launch to Captain Hauck's picture perfect landing at Edwards, leaves all of us with the feeling and the belief that America is back in space to stay.

These past two-and-a-half years since the Challenger tragedy have been difficult for the space program and those of us who aspire to its success. But during this time, we have learned a great deal about the program and the realities of space flight. We learned that the space shuttle system needed major changes to make it safer to fly, and we learned that the NASA organization needed major changes, as well—changes in the command structure and changes in accountability. Finally, we learned that space is a dangerous business, that it is not routine, and that every precaution must be taken to limit the risk to our crews.

I am pleased to say today that the necessary changes have been made. The space shuttle is basically a new system today. We have redesigned the boosters, made changes in the main engines, added an escape system and made other improvements that will go far in assuring that the shuttle is the safest machine that can possibly be made.

Changes were also made in the NASA organization. Safety is once again the primary concern of the agency, and the astronauts are involved in all phases of the operation, from booster assembly to the final launch decision. This is as it should be and I think that the mission last week proves that NASA can and will do things right.

Admiral Truly, I note that you're here with the crew today, and I want to take a moment to acknowledge the role you have played in getting the shuttle program back on track. You have appeared before us several times in these last months, and we do know how very difficult your task has been. But today you have every reason to be proud of your crew and of your team, because they have done just what you said they would do, and that has got to be a good feeling.

So, I do want to welcome all of you to the Committee today. We look forward to your film and to your comments.

Senator Riegle.

OPENING STATEMENT BY SENATOR RIEGLE

Senator RIEGLE. Thank you, Mr. Chairman, I only want to make a few opening remarks. I want to echo what you have said. Admiral Truly, for tremendous leadership he has given, Mr. Aldrich, as well, who has come through this long, trying two-year period, and to say to the astronauts and their wives who Jake Garn and I have had a chance to spend a few minutes with, how tremendously proud we are as a nation of the work that all of you and all of your colleagues at NASA and out in the supplier community have done.

It takes great courage to go into the shuttle and wait for that countdown and to take that ship back up into space. But at the same time it took literally tens of thousands of people across the country who worked on the shuttle, built parts for it, were part of the system who worked day and night, week after week, to see to it that we improved the shuttle and were able to come back into safe flight.

And I know you are here today in your own behalf and in behalf of that whole massive team because I think this country owes a great debt of gratitude to all of those people who were involved with this mission, who had any part, however large or small, in making it happen successfully.

And I just want to say one other thing, and that is that it takes tremendous personal courage, I think, on all of your parts to have been the crew to take us back into space safely and to be there and to go through those hours of work and change, and to give the great leadership and the personal commitment that it takes to lead this country to greatness. You have done that and we are profoundly grateful to you.

The CHAIRMAN. Senator Rockefeller?

OPENING STATEMENT BY SENATOR ROCKEFELLER

Senator ROCKEFELLER. I share that sense of profound gratitude to all of you, and I just can't help but notice that all of you are trained in math, science and engineering. And as these months and years pass by and as the story of the Discovery which has rekindled and inspired so many young Americans, I think one of the messages is that math, science and engineering is what made this possible.

I mean, you men studied physics, astronomy, astrogeophysics, mathematics. You have done that. And you don't just wake up one day, as an aspiring young American who says he wants to be or she wants to be an astronaut, and end up in the DISCOVERY. It is a long process of training. It involves the science, it involves the engineering, it involves intellectual discipline which is, I think, the great promise of future.

Our country has taken a rap recently for not having enough engineers, not having enough scientists, not having enough people who are willing to commit their lives in various ways to advancing science and the cause of medicine.

I mean, you were working with crystals up there that may bring the cure for AIDS, you were doing experimentations which have life-long meaning for America, but you did that not just because of your courage and not just because of your determination, but also because of your training in math, sciences and engineering.

So that, I think, is an important inspiration for young people in this country that does not have enough engineers, scientists and mathematicians.

So I salute all of you.

The CHAIRMAN. Senator Adams?

OPENING STATEMENT BY SENATOR ADAMS

Senator ADAMS. Thank you, Mr. Chairman. I was in the House of Representatives at the time of the Apollo mission, and I remember the great courage that we knew that each astronaut had for taking on that mission.

And I want to congratulate each of you for the courage you have shown in the face of exacting danger to give heart to a whole nation and to a whole group of young people that we can and will be successful in space.

Admiral, I particularly admire your patience and grit and, Captain, you are moving forward in a situation where you knew there was difficulty. And I want to personalize it a little bit by echoing what my colleague, Senator Rockefeller, said.

Mr. Nelson, Pinky Nelson, has a degree in astronomy, Ph.D., in fact, from the University of Washington, my home university, and I congratulate you on having not only that degree but having been part of that crew.

And, you, I hope and I believe, will inspire the next generation in our state and in our university to follow along in this type of exacting intellectual discipline, which is necessary and for which we congratulate you and the other members of the crew.

Thank you, MR. Chairman.

The CHAIRMAN. Thank you. And we are proud to have our own astronaut, Senator Garn.

STATEMENT OF HON. JAKE GARN, U.S. SENATOR FROM UTAH

Senator GARN. Thank you, Mr. Chairman. And I appreciate your courtesy in allowing me to be here.

I am not a member of this Committee. I am on the appropriations side, and so I am an interloper today, but I very much appreciate it and I am certainly not going to give a speech because, gentlemen, my colleagues are so tired of hearing me talk about space and bugging them about space in the appropriations process that I wouldn't do that to them again today.

I would just like to say how proud I am personally of each of you and all of the people who helped you get there. I had the unique opportunity, as you know, to spend several months of my life inside NASA, not looking from the outside, and I don't know that I have ever been more proud of people that I have worked with, and I am not just talking about the astronaut corps, I am talking about the engineers and the scientists and the instructors and even the potty trainers and all of those people, and I hope everybody realizes what a cast of thousands it takes to get an orbiter into space.

So NASA is to be greatly congratulated. A lot of fantastic people down there that I have great admiration for, so congratulations and thank you very much for being here today.

The CHAIRMAN. Thank you a lot.

Admiral Truly, do you or Mr. Aldrich have a statement? We would be delighted to hear from you. You ought to be able to talk. Brag a little now.

STATEMENT OF ADM. RICHARD H. TRULY, ASSOCIATE ADMINISTRATOR FOR OFFICE SPACE FLIGHT, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; ACCOMPANIED BY ARNOLD D. ALDRICH, DIRECTOR, NATIONAL SPACE TRANSPORTATION SYSTEM; CAPT. FREDERICK H. HAUCK; COL. RICHARD O. COVEY; JOHN M. LOUNGE; LT. COL. DAVID C. HILMERS; AND GEORGE D. NELSON

Admiral TRULY. Mr. Chairman, I can tell you it has been a long 32 months and I can tell you at this hearing that I am delighted to be here and to be flanked by the kinds of individuals that I am flanked by both in Arnie and this crew that pulled off this great mission, and I know your purpose today is to greet and honor the crew, so I will be extremely brief, but I would like to say just a couple of things.

First of all, I would like to tell you that I believe that we have done what we said we were going to do in NASA in getting this flight off. As I look back over the last 32 months and the report of the Rogers Commission and the actions that were given by your Committee and others in the Congress, I believe that we have fulfilled that. And further, I am particularly proud for the people that work in NASA.

As I look at the execution of this flight, I see a mature system. This was not a first flight. The way that this mission was pulled off by these guys was clearly a very experienced crew, an experienced training system, an experienced vehicle. And I think it is one that is going to serve our country and you well on the next flight and the next flight.

Finally, I think that is the best part of all this, from my point of view, is that we have to go out and do this again and again. And I believe that the system is ready to do that.

We have tended to look at this first mission but, in fact, the quality, the safety, the discipline that we have put into the shuttle program and made it even stronger than it was before is a strength of the discipline that is going to be in the next flight and those that follow it.

And it is not going to be long before we are flying again, and so I just want to thank you for including me today in this particular event.

I can speak for a lot of people in NASA that worked for me, other people in other corners of NASA who don't and, frankly, I think for people outside of NASA that we Americans should be justifiably proud of the way we have recovered from failure and have succeeded. And to me, I think that is very important and poises us for our future in space that I don't think we are going to back away from, and I thank you for allowing me to say that. Thank you, sir.

The CHAIRMAN. Thank you. Mr. Aldrich, would you care to?

Mr. ALDRICH. I would just like to second what Admiral Truly said and say how proud I am of this crew and of the whole NASA team that has allowed us to return now to flying back in space.

The CHAIRMAN. Wonderful. We appreciate it very much.

Captain Hauck, it is yours now, tell us about it.

Captain HAUCK. It was fun. But it was a long 32 months and we take to heart all of your remarks. As a matter of fact, after we show you a movie, perhaps there are a few points we would like to have an opportunity to discuss with you.

Admiral Truly has said it more eloquently than I can, and I think you all have too, we cannot forget that this was a tremendous team effort and we are proud to have been the five-man crew that represented that team. If we could, if it is appropriate, we would like to show you our home movies and bring out some aspects in the flight and then perhaps answer some questions.

The CHAIRMAN. Very good. We appreciate it. Let's show them.

[Movie shown.]

Captain HAUCK. This is launch morning. We are suited up in our new launch and entry suits that give us an additional capability to survive certain kinds of failures. Rather than having to ride the ship into unprepared surfaces or into the water, we can bail out.

We had a lot of well-wishers down at the Kennedy Space Center. They represented, I think, the rest of the country and I am pleased to hear that some of you were down there. It was a beautiful day.

Colonel COVEY. This is the moment that we had all waited a long time for. All the hard work had been done by the time the main engines lit. We just kind of got out there and they lit the fire and we had to do down our job. No matter whether you have flown the space shuttle before or not, I don't think you are ever quite ready for the moment that the main engines light and the solid rockets fire.

Along with everyone watching us and probably much of America, we were holding our breathes during these first two minutes. Much of the effort over the last 32 months had been directed at the redesign and the construction of new solid rocket motors. And, of course, we were all very interested in their performance.

It turns out that they have performed exceptionally well, and the teardown of those motors so far has revealed that they worked almost exactly as we expected, or they did work exactly as we expected them to. Although the first two minutes are very critical, the next six and a half after that are also very critical to those of us close to the program because we know that we cannot attain a safe orbit unless the main engines continue to operate properly. Much work had been dedicated over the 32-month period to ensuring that those main engines worked as well as possible, and they did.

Mr. LOUNGE. This is a shot of sunrise on orbit, one of 65 we saw during our mission. Once we got safely into orbit we got busy because we had a tracking and data relay satellite to deploy on this first day, about six hours into the mission. We each had roles to make this deployment successful. Rick and Dick are up in the front of the vehicle checking out the orbiter systems and making sure the orbiter is ready to do the separation maneuver that it must do after we deploy the satellite.

Here is Dave on the aft flight deck checking telemetry from the satellite, making sure it was healthy and ready to be deployed.

And there is a shot of the tracking and data relay satellite on top of its inertial upper stage booster. That was a very beautiful satellite and impressively large, looking out the payload bay there.

My job, using these switches on this switch panel at the appropriate time, was to arm the deployment circuits and finally throw a switch that fired pyrotechnic devices, severing the connection to the support structure and allowing push-off springs to push that 20-ton assembly of hardware out of the payload bay at about a half a foot per second. And that was a very majestic sight to see.

Colonel HILMERS. As you see the satellite being deployed, about 60 minutes later it burned the first of two solid rocket motor burns that would eventually put it up at geosynchronous altitude. The burns were very precise and we ended up within just a fraction of a foot per second of our target.

Pinky was our photo documenter for the flight and on the deploy. Rick backed away from the satellite with a maneuver which allowed the satellite to be viewed out the overhead windows.

The satellite itself is not only used by NASA but also will be used by a wide variety of commercial and military applications, and it is going to be very useful for all missions subsequent to the one that we flew.

Mr. NELSON. Besides the large payloads that we can carry out in the payload bay, we have an honest to goodness scientific laboratory down on the mid-deck and in that we did 11 experiments on this flight.

This particular one involved growing crystals of various biological proteins that will be used to study, very basic research to study processes in diseases ranging from AIDS to cancer.

Mr. LOUNGE. On the other end of the spectrum we carried student experiments designed by high school students across the country. We had two of them. This was an experiment to melt titanium wires and then to investigate their behavior upon resolidifying in weightlessness.

Mr. NELSON. A very important project we have is to carry experiments designed by high school students, mainly to do some science and also to promote the interest in science among those students. And this is another of those experiments that grew very large crystals, very quickly and graphically, and shows them some of the things that they can do on orbit.

Colonel HILMERS. Another experiment that we carried was one which examined the demixing characteristics of fluids. This process is extremely useful in developing new biological materials. We had 18 chambers filled with two different fluids which we examined in zero gravity.

Mr. NELSON. We did some engineering experiments also. This one was to photograph the earth's limb just at the moment after sunset and before sunrise to aid in the design of sensors on future satellites.

Colonel COVEY. After deployment of the TDRS satellite, much of our time was devoted to one of the astronauts' favorite pastimes which is earth observations. Not only do we look at the earth but also document it with photography.

To give you an idea of the magnitude of this particular program, on our flight we took over 1800 photographs of the earth and we shot over 4,000 feet of 16-millimeter film, much of which was like you see here, of earth views. This is a very spectacular view of the Nile River, the Red Sea and Sinai. We quite often got to see this part of the world because of clear days and because of the way our orbital track took us.

There is much interest in the photography that we bring back from the space shuttle and it is interdisciplinary. Geologists use it to study the geology throughout the world. Atmospheric scientists are interested in it, not only for meteorological reasons but also to see the effects of such phenomena as the burning of the equatorial jungles. And oceanography is becoming a more and more important study using space photography.

This is a very spectacular view of the Hawaiian Islands. Because of our orbital track which only went to 28 degrees north, we were unable to see much of the United States. One place that we did get to see a lot of was Hawaii. We always looked forward to it not only because of its beauty but also because it is of great interest to the geologists because of the volcanos that have formed the islands.

We used a variety of cameras and lenses to document our earth observations. The 70-millimeter Hasselbland camera is the standard with lenses ranging from 50, which give a very broad perspective, to 250-millimeter lens which can produce a close-up much like what you are seeing here of the Canary Islands off the coast of Africa.

There was unusual atmospheric clarity during the time of our flight, in fact the best that the people that look at this type of photography have seen in quite some time, particularly in the northern hemisphere. This is a view looking north over the Himalayan Mountains into China, and it is a thousand miles to the horizon and you can see it quite clearly.

Mr. LOUNGE. This is a wide-angle view of the mid-deck of the space shuttle. It is used as the scientific laboratory, as Pinky said. It is also the dining room, gymnasium, the bedroom, the meeting room. And this is a scene of one of the meals.

We went to some trouble documenting this kind of activity just to show the kind of interesting things you can do in weightlessness, a little target practice here. We take these films to many schools and talk to a lot of young people, and it is nice to have scenes that show what it is like to live and work in space.

Colonel HILMERS. We had our own zero G aquarium with some fish in it.

Mr. NELSON. Sometimes you have to unwind the commander a little bit. We do carry a treadmill on board to get exercise during longer missions. This mission was short enough that we really didn't really use the treadmill except as an Olympic demonstration event for Mike.

Mr. LOUNGE. I think we had American judges. They were fairly easy.

Mr. NELSON. Real body-surfing.

Captain HAUCK. Those Hawaiian shirts were given to us by the workers at the Kennedy Space Center when we first powered up Discovery prior to rolling it out to the pad.

Mr. NELSON. Prior to reentry we needed to don the pressure suits that we had worn for launch, and that is a fairly involved task of squeezing yourself into the suit, kind of a rebirth, coming out the top, and then set up the cabin, get ready for further reentry. It is really a team effort to get the ship ready to come home.

Captain HAUCK. Here is a beautiful shot that almost does justice to a sunset on the orbiter. You will see the colors change as the sun disappears. This is real-time photography.

Well, that signalled the end of our four-day mission. We closed the payload bay doors, did our de-orbit burn halfway around the world and brought this fantastic machine back to the Edwards Air Force Base lake bed. We were told there were over 425,000 people waiting there to welcome us back which tells me that there certainly is a fair amount of grassroots support for this program.

Dick Covey flew the machine a little bit subsonically and handed it over to me, and then at 300 feet put the landing gear down. Once again, the feel of the shuttle as we landed, it was just a beautiful airplane to fly, and we knew that finally when we came to a stop after about 7500 feet of ground roll, calling wheel stop to Houston, that this mission that we had waited so long to accomplish was completed.

Our crew patch, the symbolism of a new beginning with the sunrise, the aeronautic symbol from the NASA logo meaning we were really depending upon the strengths of NASA and the seven-star Big Dipper for the Challenger crew.

Captain HAUCK. I think we could probably dispense with the slides. I think that gave you a very good overview of what we did and we appreciate the opportunity.

The CHAIRMAN. Captain, that was not only a perfect flight but a perfect landing. Millions like myself and others here were watching you land the shuttle right on line.

You had some other items you said that you ought to bring to the attention of the Committee and we would be glad to hear about them.

Captain HAUCK. Senator Riegle asked us earlier when we were meeting with him informally if there was anything that concerned us, and we appreciated the opportunity to comment on that. I would like to bring up one concern that I have and it has to do with the fact that so many people put in so much time to make all this happen, many of them, I think, that felt an obligation to stay with NASA or with the company that they were working with to see the program back into flight, and I think a fair number of those people may be leaving us.

And I know that you have been concerned, this Committee has been concerned in the past about how we retain good people in government service, the kind of people that Senator Rockefeller was talking about that have grounded themselves in science and engineering, and I am hopeful over the next several months or years that we don't see an exodus of those good people, but I know that perhaps with some help from this Committee we can think of ways to retain those folks.

The CHAIRMAN. We have that same concern. You have got to have commitment, along with the commitment the money, and, finally, of course, even with commitment and money unless you have the expertise, the personnel attracted to the program, you are going to be in trouble.

Now, you folks have helped us with the last item and when people see that, young people turn on to the challenge of space. We have in my home state a big space weekend and we bring in the high school students experiments and everything else. It is just like a state fair.

In fact, Christa McAuliffe was scheduled to be there at the last one a couple of years ago. We as a Nation have the commitment, and you can tell because of the interest in and reaction to your flight. You have taken care of the commitment and the attraction of the best and the brightest into the program. Now comes the money.

And someone ought to tell you our difficulty because Senator Riegle, myself, and others have been negotiating with the House on an authorization bill, and the only way—I also am on the Appropriations Committee with Senator Garn and Senator Kasten here—and the only way we can maintain a space program during these times of financial crunch is almost patchwork. We have limited space station funding through next May because of budget constraints and to give the next President enough time to find out about his commitment to the space station program.

And in that light, we as an authorization Committee could very easily go down a grocery list and assume a manned Mars Mission, a 15 percent budget increase for each of the next 5 years, a 10-year plan, but it would be meaningless. We would lose our credibility unless we pattern it to realism, and we have been trying to do that with our House colleagues all this week. In fact, I just left another conference to come over here to welcome you folks, but that is our difficulty now.

You have done your job and what you are saying in that observation and concern is for God's sake let the politicians get off their duff and do their job, and we appreciate that.

Senator Riegle?

Senator RIEGLE. Mr. Chairman, on that very point, it was also mentioned that part of the difficulty may be not just having reached the point of this success and all of the time and effort it has taken but also to make sure that within NASA we maintain competitive salary levels and work conditions to those in the private sector. This is always difficult because the private sector is in a position to bid for talent, especially these very highly skilled individuals who have unique capabilities. I think it is very important that through both the altruism and the actual structure of what we can offer people in terms of salaries and benefits, to be able to compete and to keep the best people or at least the sufficient share of the best people in the public sector doing the public's work. And you all have been doing that, and you have been doing it at some personal sacrifice.

That is not to say that there aren't great rewards, clearly there are, but I think we have to pay attention to the question of the disparities that are growing because we do need to attract and keep these talents and we have a very ambitious launch schedule in the future.

You mentioned, Admiral Truly, the fact that we intend to fly one more flight this year and then we have a very ambitious schedule next year. And in order to continue to maintain the excellence around this successful flight, we have got to keep the best possible team in place.

And if some folks leave, they have got to be replaced by people of equal talent. And I would hope that part of the discussion that we have today and other days will help draw good people in, that a large number will stay on to help us take the next steps but others will come to take up that responsibility as well.

I think that is critically important. And the only other thing I would say to you, as we have discussed before, you gave us an assurance, Admiral Truly and Mr. Aldrich and Commander Hauck, that you would not fly until we were ready to fly safely. And you kept that pledge and we are all here today at a happy moment.

And my hope would be that as we now move forward into that more ambitious launch schedule that at no point in the future will we ever let the pressure of that launch schedule cause us to go before we are ready.

And I think no matter who it is, if somebody has got to say, "Look, we are not quite set for this reason or that reason," that needs to be done. Now, if that means taking more time, then we always must take the time we need so that every future crew that goes up, goes up knowing that conditions are right for a safe flight. That test will be upon us. If we are going to make seven or eight or nine launches next year, it is going to really test us in the extreme.

Senator ROCKEFELLER. Just maybe a continuation of what I was saying before.

Commander, I notice that you indicated that you are going to be retiring. I don't know whether you are going to be staying at NASA or not, but this whole question that Senator Riegle brought up of parity among wages, well, let's just face it, in public service if you are working for EPA as an air chemist or if you are working at NASA in a variety of those complicated positions, or if you are working at the Department of Justice, you don't make what you can make on the outside.

And I worry about that a lot. In fact, I worry about the whole concept of public service. I think public service has taken a hit in recent years. There is a tendency somehow to deride public service and get out into the private sector, make your own, feather your own nest, and you are the personification of the opposite.

Frankly, getting back to the science and math and engineering matter, I don't think you become an engineer unless you start to make those plans when you are about 11 or 12 years old. There is an instinct, there is a role model, there is somebody in your life who triggered you, one, to become an engineer or obtain the various skills that all five of you have who flew and, secondly, to go into a public service program for the nation, for the world, as opposed to private practice working for

a corporation where you could have made maybe $20,000, $30,000, $50,000 more per year.

Commander Hauck, I would just like to ask you, how was it that you got to the training, decided to get into the training that you did? Was there conflict in your life as you came along picking between a private sector, working for a private corporation or working for NASA where money was going to be less, you never could be sure you were going to fly? What were some of the decision points in your life as you went along?

Captain HAUCK. Well, I think I had some great role models, Senator Rockefeller. I had an uncle who was a naval aviator, a father was a naval officer, my grandfather was a naval officer, and I never thought of anything else but going into the Navy.

So we all know that role models are very important. I was stimulated in my high school education to study physics here in Washington, D.C. at St. Albans School and I pursued that, and I love the Navy and flew, enjoyed it.

So I think I agree with you that the rewards that you have, the intangibles in the service to the government, service to your country can mean a lot more than cash.

I have made a decision myself to not fly another space mission but I look forward to serving the country and government, whether it is with the Navy some more or perhaps in some other capacity, but I think that what we do see here with the NASA team is that dedication that you referred to, and I think that we have great hopes for the future and seeing that the people that came out to cheer us at our launch and to cheer us at our landing is reflective of that kind of support and people that do hold those same values closely, as you suggest.

Senator ROCKEFELLER. Thank you, sir. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Did you want to say something?

Senator. KASTEN. Mr. Chairman, thank you. I want to echo the compliments of other members of the Committee and say that it sounds as if all of us are anxious to work with you and support you. Maybe you ought to be appearing before some other Committee in trying to gain support. We have become cheerleaders here.

I think it is important to recognize the point that Senator Hollings made about how tough the appropriations process is. Jake Garn knows this better than anyone because he has been fighting at every step for the space program in that process. It is especially difficult when we end up forced into a squeeze between defense and space. That is a squeeze we shouldn't be forced into, but, unfortunately, it has worked that way the last two times in the appropriations process.

We have got to stop that and I think the work that you are doing will give those of us that are supporters of NASA more ammunition to show how important this program is to our entire scientific community and all of America. So I thank you and I congratulate you for what you have done.

The CHAIRMAN. Would any of the other astronauts—I like the way you synchronized your presentation. If we could get Senatorial discussion synchronized like you folks, we could have adjourned in March.

Would any of you like to emphasize any additional points?

Captain HAUCK. I think some of my other crewmen might have some thoughts they would like to share.

The CHAIRMAN. Good. Let's hear from them. We really are at your disposal and we appreciate it.

Mr. LOUNGE. Yes, sir, Mr. Chairman. I am privileged to be here today and to have this opportunity, and I know we are preaching to the choir a little bit here.

One concern I would voice is that we appreciate and understand the depth of support we had throughout the country in getting this mission off, and we have sensed over the last years, while we weren't flying, that some of our competition was doing great things.

And we have all had concerns about losing our technological leadership in the world, losing our place as leaders, and I hope that there is not a letdown after this flight because we are not there. We haven't answered that challenge, we have just taken that first step that enables us to answer that challenge.

The CHAIRMAN. Very good. Any of the others?

Admiral Truly, thank you very, very much, Captain Hauck, each of you. The Committee is indebted to you, the country is indebted to you. Thank you very much.

Senator GARN. May I just make one more comment and pick up on what you said about getting the Senate more organized? I had the opportunity to spend four months at NASA with people who knew what they were doing and then I had to return to the U.S. Senate, and that was the most difficult transition that I had in the whole process.

The Chairman: Very good.

Senator ADAMS. With that comment, Mr. Chairman, there is nothing further to say.

The CHAIRMAN. We are not going to argue that point. Thank you all very, very much. Particularly thank your wives too.

[Whereupon, at 4:55 p.m., the hearing was adjourned.]

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